MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 1, 2019/2020

TSN2201 –COMPUTER NETWORKS

(All sections / Groups)

16 OCTOBER 2019
09:00 – 11:00
(2 Hours)

INSTRUCTIONS TO STUDENTS

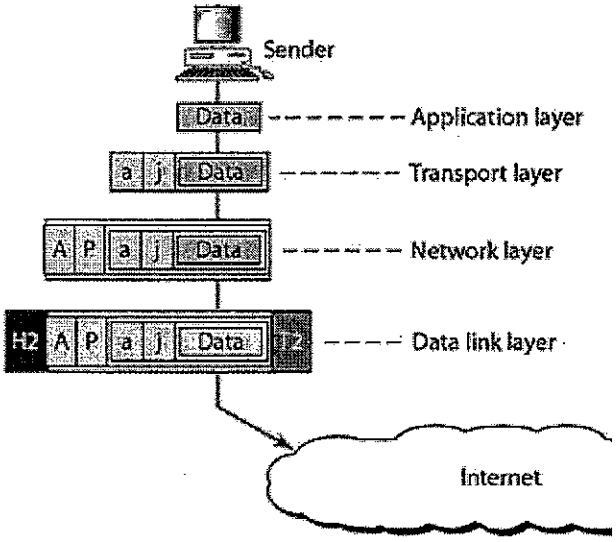
1. This Question paper consists of 7 pages including this cover page.
2. This Question paper contains **FIVE** questions of **10** marks each. Answer **ALL** questions.
3. The distribution of marks for each question is given.
4. Write all your answers in the Answer Booklet provided.

Question 1

(a) What type of data flow is used in walkie-talkie communication? Explain your answer.
(1 mark)

(b) Draw an example of a star topology with four devices. Give TWO advantages of using this topology as compared to mesh topology.
(2 marks)

(c) The following figure shows data encapsulation at the sender host. Answer the questions below.



(i) State the names given for each data unit in transport layer, and data link layer.
(1 mark)

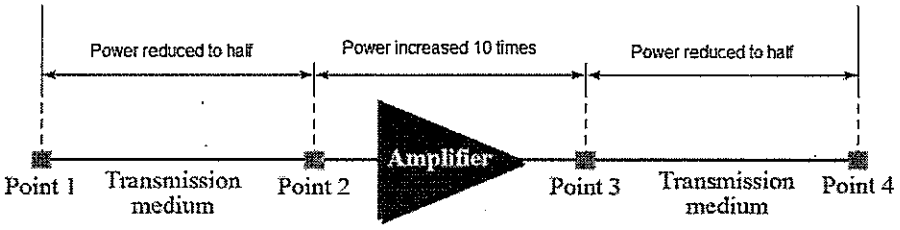
(ii) Data in the transport layer is added with address *a* and *j*. What is this address? What is the size of this address?
(1 mark)

(iii) What type of address is added to the payload data in the network layer? Explain briefly why this address is important in network layer.
(1 mark)

Continued...

(d) The figure below shows a signal travelling from point 1 to 4. Calculate the changes of signal strength (in dB) from point 1 to 2, point 2 to 3, and point 3 to 4. Lastly, calculate the overall change of signal strength from point 1 to 4.

(2 marks)



(e) A periodic signal has four sine waves with frequencies of 300, 400, 700, and 1000 Hz. What is the bandwidth for this signal? Draw the frequency spectrum, assuming the maximum amplitude for all components is 8V.

(2 marks)

Question 2

(a) A noisy channel with a bandwidth of 2 MHz has a signal-to-noise ratio of 3981. What is the maximum data rate supported by this channel?

(2 marks)

(b) Signals can propagate in omnidirectional and unidirectional in unguided media. Explain briefly the two propagation modes. Give an example for each of them.

(2 marks)

(c) What is the size of a link-layer address? Define the type of following link-layer destination addresses.

(i) 57: 20: 1C: 34: 08: EA
(ii) FF: FF: FF: FF: FF: FF
(iii) 4B: 33: 10: 21: EE: 1B

(2 marks)

(d) A dataword was encoded using CRC with the divisor 1001, and the codeword 1111010011101 was received by the destination device. Check whether the received codeword is error free or corrupted. Show your checking steps clearly.

(2 marks)

Continued...

(e) Using 8-bit frame sequence number, what is the maximum size of the send and receive windows for each of the following protocols:

(i) Selective-Repeat ARQ
(ii) Go-Back-N ARQ

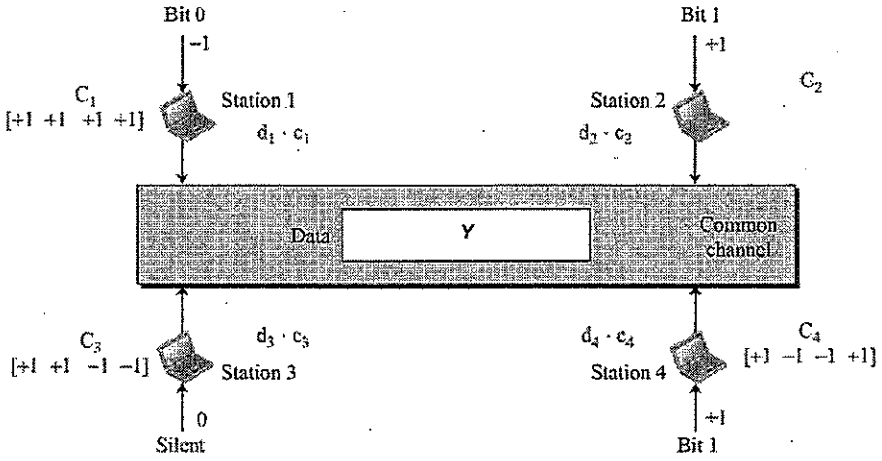
(2 marks)

Question 3

(a) Why bit stuffing is required in HDLC frame? Explain (with an example) how bit stuffing is done in HDLC frame.

(2 marks)

(b) The figure below shows the data sending of four stations using CDMA. Answer the following questions.



(i) Show how to generate the chip sequence C_2 for station 2 using the Walsh table.

(1 mark)

(ii) Find the answers for $d_2.c_2$, and $d_3.c_3$. (1 mark)

(iii) Find the data sequence Y in the common channel. (1 mark)

(c) Explain (with the help of a figure) what is scatternet in Bluetooth. (2 marks)

Continued...

(d) Why is Spanning-Tree protocol (STP) needed in the data link layer? State the FOUR steps involved in STP convergence.

(3 marks)

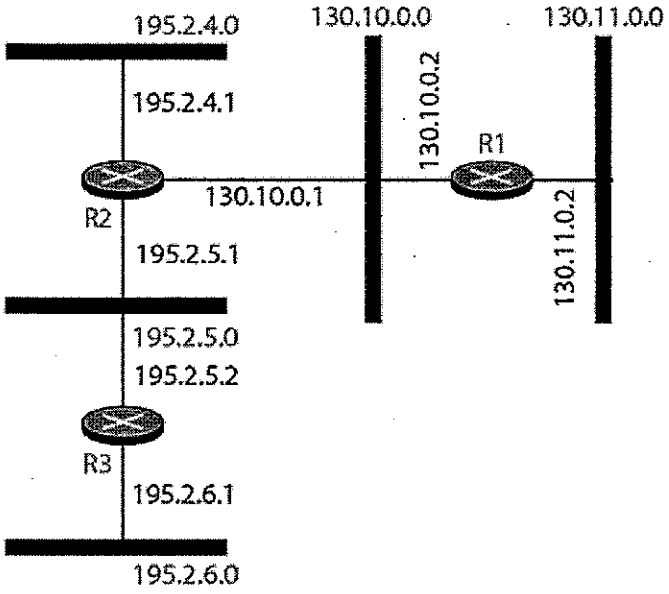
Question 4

(a) What are the TWO routing types in the intradomain routing protocols? Give one example for each of them.

(2 marks)

(b) RIP is the routing protocol used for the following network. Write down the routing information found in the routing table of R1. The routing table should have three columns, i.e. destination, hop, and next.

(2 marks)



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(c) A university is granted by an ISP a block of IP addresses, beginning with 55.66.13.0/24. The university requires 5 subnets to be assigned to 5 faculties. The number of addresses for each faculty is listed in the following table. Apply VLSM (Variable Length Subnet Mask) addressing scheme to these subnets and answer the following questions.

Faculty	Number of IPs/ Hosts
FAA	13
FBL	30
FCI	62
FCM	6
FOE	28

(i) Can we use fixed length subnet mask for these 5 subnets? Explain your answer. (1 mark)

(ii) What is the subnet mask for the largest faculty (FCI)? Find the first and last IP addresses for this subnet. (1 mark)

(iii) Find the IP address ranges for FBL and FOE. (2 marks)

(iv) Find the subnet mask for the smallest faculty (FCM). What is the IP address range for this faculty? (1 mark)

(d) In a process-to-process delivery, socket addresses are used. What are the TWO identifiers in a socket address? (1 mark)

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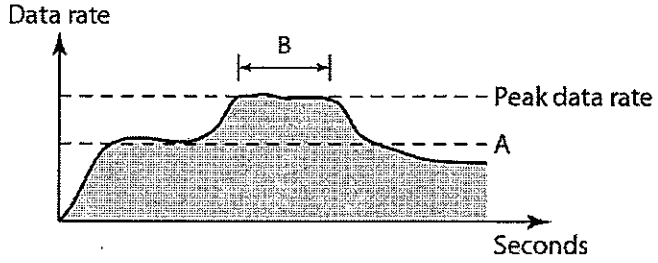
Question 5

(a) The following figure shows the traffic descriptor for a computer network. Answer the questions below.

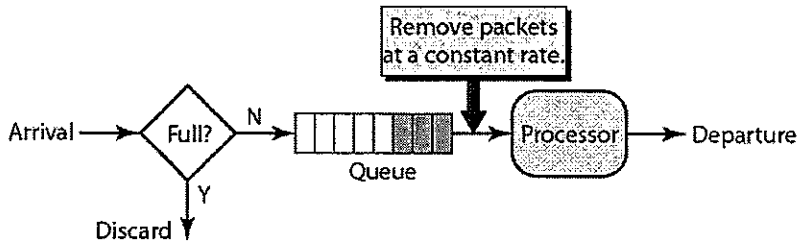


i) Name the traffic descriptor *A* and *B* (1 mark)
ii) Explain briefly traffic descriptor *A* (1 mark)

(b) What is the key difference between Choke Packet method and Back Pressure method in congestion control?

(1 mark)

(c) Answer the following questions by referring to the figure below.



(i) Explain briefly the term traffic shaping. (1 mark)
(ii) The diagram above shows one of the traffic shaping technique, name this technique. What happens if the queue is full? (1 mark)
(iii) Is this technique suitable for hosts that are always idle and only send bursty data at maximum rate when necessary? Explain your answer. (1 mark)

(d) In electronic mail, there are push and pull protocols. Explain briefly these protocols. Give an example for each of them. (2 marks)

(e) Name the TWO modes operated by the IPSec protocol. What is the key difference between the two modes? (2 marks)

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